Technology Commercialization Committee - Draft Recommendations

Situational Analysis: In 1999, the Arizona Board of Regents ("ABOR") adopted modernized policies governing technology commercialization and university-created intellectual property. Over the past year, all three Arizona state universities have, with the support of the State, taken significant steps to improve their technology commercialization capabilities. Funds generated from the voter-approved Proposition 301 initiative have enabled the universities to make a number of investments that have advanced the state of technology commercialization in Arizona. Some of these steps include: hiring technology commercialization professionals with significant industry experience to manage their technology commercialization offices; restructuring technology commercialization activity to make it easier for industry to gain access to university technology; and increasing the level and quality of faculty outreach and education in order to foster a more innovative university culture. Most recently, the Governor proposed, and the Arizona legislature passed, legislation and a proposed constitutional amendment to allow universities to accept equity as consideration for commercializing technology through the private sector (the "Tech Commercialization Constitutional Amendment"). As well, the Governor signed a bill in 2003 that allows an additional $440 million for the construction of new facilities for Arizona's public universities.

Notwithstanding these advances by our universities and the increased support and interest of the State, there is still a great deal of work to be done to make technology commercialization in Arizona competitive nationally and internationally. Against this backdrop, the Council performed a critical examination of technology commercialization activities in Arizona and recommends a multi-year roadmap that incorporates the universities, private enterprise, State and local government to foster a diverse technology industry base in Arizona.

Issue Statement:	**Recommendation: Spearhead Passage of the Tech Commercialization Constitutional Amendment**
The Governor proposed, and the legislature passed, the Tech Commercialization Constitutional Amendment. It would allow State universities to accept equity in private sector companies as a form of consideration in tech commercialization transactions. Now the measure must go to the people of Arizona for final approval. That approval is not assured.	Develop and coordinate an aggressive educational campaign to ensure that Arizona voters pass the Tech Commercialization Constitutional Amendment in November 2004: • Educate the Arizona public about the role of university technology commercialization in promoting economic development and enhanced quality of life. • Emphasize the benefits of the Tech Commercialization Constitutional Amendment to private sector companies and taxpayers. • Create a broad and visible committee of supporters of the amendment that can serve as a reference body to key voting groups in the State. • Address concerns that arise by ensuring that mechanisms are in place to protect the State's interest. For example, once voters pass the Tech Commercialization Constitutional Amendment, existing conflict of interest policies adopted by the Arizona Board of Regents should be reviewed to ensure credibility and maintain highest academic standards. In addition, each university should develop policies to govern management of equity interests held by the university.

Timeline and Metrics: TBD	
Issue Statement: Universities are, by their nature, excellent environments for the generation of ideas and are the critical links to establish world-class research in Arizona. Conditions that foster creative activity - significant facilities and infrastructure, eclectic and interacting intellects, and freedom of thought - allow an active flow of original concepts. However, for ideas to be translated into products, services and economic development, the innovation process ultimately involves many elements including: protection, promotion, and commercialization. Many creative faculty, staff, and students are unfamiliar or uncomfortable with this process as this has not been a traditional university endeavor. Until we identify and remove these cultural roadblocks and clear the way within universities to more widespread technology commercialization activity, we will miss the opportunity to fully utilize *university knowledge as an economic development resource.*	**Recommendation: Support the Continuing Evolution of University Culture to Emphasize Innovation** • Universities should value and encourage faculty technology commercialization activities by including them in merit, promotion, tenure and retention metrics, and by considering such activities when hiring new faculty. • Successful technology commercialization requires support from a number of university stakeholders: faculty innovators and their laboratories; university colleges, departments and institutes; and the overall university administration. To provide incentives for commercialization, each university should develop and periodically review clearly articulated policies for sharing revenues among all stakeholders. These policies need not be the same for each university, and should be tailored to meet the needs of each institution and its stakeholders. • Consider an Arizona Innovation Scholar program, modeled on similar initiatives in other states to promote technology-driven economic development. An example is Washington's Advanced Technology Initiative. Such a program could take many forms, for example, five-year awards of $250,000 per year per recipient could be made for translational research by faculty at the three Arizona universities, perhaps initially in one of the four areas set forth in the Arizona Technology Development Roadmap. Depending on funding availability, a successful program might provide five awards per year to support or recruit world-class researchers committed to commercializing innovation. The Governor should appoint an *ad hoc* committee to determine the structure of the program, and identify possible sources of funding from both the private and public sectors.

Timeline and Metrics: TBD	
Issue Statement: Great strides have been made to emphasize and improve Arizona's university technology commercialization policies, processes and function. This transformation should continue by letting the recently enhanced technology transfer offices do their jobs based on agreements negotiated with the private sector with as little governmental regulation as possible. Providing greater outreach to and access by the private sector through a 'customer focused' technology commercialization operation will enhance this transformation. We must create tools and support program stability to promote greater interaction with the private sector.	**Recommendation: Promote Greater Interaction and Collaboration Among Arizona Universities and the Private Sector** • Create a web-based technology directory at each university to make it easier for the private sector to access information. The decentralized nature of the three universities makes it nearly impossible for the private sector to know what resources are available and who the points of contact are. An "Arizona Research Resources" point of access on the State of Arizona web site should link all the directories and include: 1) Fee-for-service specialty equipment and core facilities at each university that are available to the private sector. Some of this information currently exists, but not in a single, accessible form. For example, U of A has compiled a list of its equipment and core facilities available for biosciences. 2) A directory of faculty and research areas and an inventory of specific research being conducted, patents filed, etc., so the private sector can identify potential areas of collaboration and commercialization. The Community of Science website could be explored as a venue for this. 3) Enhanced web-based infrastructure for contracting and accessing expertise at the universities. Provide details on the types and nature of contracts available through the universities, points of contact, process and limitations on allowable activities and terms imposed by Federal and State law and ABOR policy. Provide similar information for contract research organizations that may provide services not available through the State or that can meet terms and conditions, such as long-term covenants on secrecy, incompatible with university missions and tax status. • Work with the State and regional technology councils to develop an annual "Technology Showcase" of research activities to promote greater collaboration. Involving all three universities along with private research-and-development-based companies would provide a single venue for participants, businesses and venture capitalists to learn about technology and resources available in Arizona. • Utilize outreach and other capabilities of Arizona's existing regional technology councils to better engage local technology companies in the university technology commercialization process.

Timeline and Metrics: TBD	
Issue Statement: Stronger ties between the University-based technology commercialization organizations and Arizona economic development functions are needed to increase the scope and reach of technology commercialization initiatives. It is clear that increasing the speed and efficiency by which university-derived technologies are transferred from conceptualization to application, is one of the primary objectives of state economic development. Like money and tax incentives, cutting edge technology and technology development programs based at Arizona universities are significant assets that should be considered part of the State's economic development "tool kit." Today, there is no efficient means for information to flow back and forth between economic development organizations and the universities.	**Recommendation: Build a Stronger Partnership Between Arizona Economic Development Organizations and University Technology Commercialization Programs** • The Governor's strong public advocacy for university technology development and commercialization should be continued and expanded to include leadership of state and local public and private sector economic development organizations. • One or more liaisons appointed in either the Department of Commerce and/or other state and local economic development organizations should be appointed to serve as facilitators of information flow between the universities, their technology commercialization offices and the agencies managing economic development. These liaisons would have a direct link to the university technology commercialization offices and meet periodically to push technology commercialization initiatives forward. These individuals could also work with the universities to: (i) host companies from other states and countries to come to Arizona to see university technologies and capabilities, and (ii) match large companies from within and outside of Arizona with small university start-ups. The advantages of such a position include: 1. Efficient flow of information between the State and universities to promote rapid deployment of selected technologies into Arizona-based businesses. 2. Faster implementation of State initiatives that benefit the universities 3. The State would have a better understanding of one of its economic development assets (university-based technologies) and how to best utilize these technologies to attract outside business to the state on an ongoing basis. 4. With global exposure to all Arizona university tech transfer initiatives, the State can help the universities identify synergies and help to build a consolidated technology front among Universities. 5. The State and the universities would have an avenue to be better coordinated on future technology-based strategies. 6. With a better understanding of the universities' portfolio, the State could significantly bolster the technology commercialization marketing effort of the universities on a national and global basis.

Timeline and Metrics: TBD	
Issue Statement: Much of Arizona universities' current technology investment is research "push" oriented: universities invest in research based on the interests of faculty and the availability of federal funding. Conversely, most investors invest in technology based on market "pull": the presence of a large market of customers for which a technology will create value. Because an estimated 85% of university research is funded by the federal government for purposes dictated by national policy, it is not practical at this time to expect universities to make research decisions entirely on "demand pull" basis. However, initiatives can be developed to help faculty researchers link their federally funded research efforts to broader opportunities. These include collaborations with industry and funding through federal development grants, contracts and other technology development programs.	**Recommendation: Focus University Technology Development on "Demand Pull" Technologies** • Arizona State government and interested foundations should continue to refine technology roadmaps by creating new economic development methodology based on the creation of integrated value chains that deliver high value to future markets characterized by large size and high-growth and enabled by innovative technologies in which Arizona can be globally competitive. • These efforts should identify a series of large market-driven opportunities that can serve as the focusing lens for the research "push" investments being made. • State government and private foundations should develop a means of regularly communicating and coordinating these efforts with university technology commercialization offices. In turn, these opportunities should be communicated to university faculty on a regular basis.
Timeline and Metrics: TBD	

Capital Formation Committee – Draft Recommendations

Situational Analysis: Access to capital is one of the most critical foundational elements for creation of new entrepreneurial companies. More than 40 states' economic development platforms incorporate programs to improve entrepreneurs' access to early stage and seed capital The uncertainty of the traditional private equity markets and the consolidation of local financial service providers have made it very difficult for even the best early stage companies to find funding.

Access to capital is also a point of competitiveness. Savvy entrepreneurs shop for markets that offer the best financial infrastructure and resources to grow their companies. Technology executives seek employment in areas with strong venture equity markets; creating multiple opportunities to find positions with other venture-backed companies in the same area. This is particularly true for serial entrepreneurs and/or senior executives who are unwilling to continually move from one city or state to another.

Recent market conditions in equity markets have changed the venturing cycle so that more dollars are now invested in later stage companies, further underscoring the need for angel and seed stage investment. Arizona lags behind other states in this local infrastructure. To create new companies that attract later stage capital and talent, Arizona must create the infrastructure and entrepreneurial business climate that allow us to grow concepts and technology into successful Arizona commercial enterprises.

While patents and R&D spending in Arizona may indicate a good level of innovation, the lack of venture capital indicates the difficulty that Arizona industries face in commercializing innovation. Only once during the period of 1995 to 2001 did Arizona's share of U.S. venture capital investments exceed 1% and that was in 1995. By comparison, Arizona's gross state product accounts for 1.6% of the U.S. total and the state's population equals 1.8% of the U.S. Moreover, as the economy boomed in the latter half of the decade and venture capital placements nationwide soared, the state's share fell by about half to 0.6% of the total.

Arizona's apparent lack of venture capital worsens when compared to states with which we compete for technology industries. Arizona ranks at the very bottom of these states when comparing venture capital investments as a share of gross state product. Arizona's ranking for access to capital, 29th, appears to be sinking based on 2002 data. This is even more disturbing considering the impact of venture capital in Arizona's economy. A 1999 study by the Zermatt Group of Wharton determined that every $1.00 of venture capital invested in Arizona returns $6.54 to the state.

The Flinn Foundation, in their commitment to build the state's bioscience industry, commissioned Battelle to create the Bioscience Roadmap for Arizona. As a result, the Governor's Council on Innovation and Technology, in concert with the Flinn Foundation capital formation workgroup, has developed recommendations to facilitate the formation of and access to capital.

Issue Statement:	**Recommendation: Establish an Arizona Small Business Opportunity Program**
Many of Arizona's current economic policies encourage low wage job creation. Access to capital, higher education and technology commercialization improvements are interrelated, essential links to fostering an entrepreneurial business climate. As stated in the Morrison Institute "Five Shoes Waiting to Drop" report, the ability of communities to take concepts and create new companies will be an important factor for future metropolitan economies. The lack of venture capital represents a serious shortcoming to Arizona's economic competitiveness going forward. As a result, small, innovative, homegrown industries will face difficulties in expanding operations and taking new ideas and products to market. Also, small, mobile entrepreneurs could be enticed to move operations to southern California, the Bay Area, or elsewhere just to be near sources of venture capital.	Establish a tax credit program to encourage angel investing. A scheduled tax credit of up to 30% for equity investments made in "qualified Arizona companies and/or angel funds" would provide an incentive to build Arizona's technology-focused, entrepreneurial community. Consideration should be given to increasing the tax credit up to 35% for rural investments. Proposed legislation could include a limit on the maximum cost to the State over a 5-year period - not to exceed $20 million. • Establish specific eligibility criteria for "qualified angel/seed funds" and for "qualified Arizona companies" that would allow investors to be eligible for a tax credit. • Angel funds would invest in pre-venture/early-stage companies that have production prototypes demonstrating a product/technology.
Timeline and Metrics: TBD	

Issue Statement:	**Recommendation: Establish Arizona Venture Capital (fund of funds) Program**
More than 20 states have created pools of capital (fund of funds) to incentivize more venture capital investments and attract venture capital firms. The creation of a "Fund of Funds" program similar to Utah, Oklahoma, Iowa, etc., would encourage more equity funding in Arizona. Many states have had success in developing a venture capital industry through "fund of funds" programs. Arizona has no statewide capital formation program to encourage investment and is therefore at a tremendous disadvantage compared to the rest of the country. Arizona possesses an outstanding university system with research built around several hundred million dollars of annual federal/corporate research grants. Technologies include life sciences, optics, computer science, homeland security and bioengineering. The various centers of excellence in the University system create technology commercialization opportunities upon which Arizona must capitalize.	Create a $100 million pool of funds capitalized by the private sector. No direct state funds are required, however, contingent state tax credits up to 50% of the total fund are recommended to assist in aggregating the fund. The purpose of this program is to build Arizona's venture capital industry and make matching funds available to experienced venture capital partnerships with an interest and intent to invest in Arizona companies and/or open a local office in the state. The program would concentrate matching monies to eligible venture funds that meet specific criteria set forth by the Strategic Investment Board (SIB), including a comparable level of investment and/or creation of an office in Arizona. **Facilitate creation of a Native American/Rural Technology Investment Fund -** Source for direct, syndicated or matching investments in ventures designed to provide high ROI for tribal governments and rural areas, develop employment and infrastructure opportunities for tribal and rural citizens, and unique investment capital assets for Arizona's technology community.
Timeline and Metrics: TBD	

Issue Statement:	Recommendation: Enhance Arizona's R&D Tax Credit program
Although Arizona's R&D tax credit is in the mainstream of other states programs, modifications could enhance research dollars for the class of firms Arizona is targeting in the biosciences and other technology related fields. Arizona's R&D tax credit offers no incentive for the private sector to partner with the universities to develop cutting-edge research. Without such collaborative partnerships, Arizona will be hard pressed to position itself as a world-class research and development destination. **Timeline and Metrics: TBD**	• Expand the existing Research & Development tax credit program to include a "super credit" for research expenditures pursuant to sponsored-research agreements with an Arizona university, possibly featuring: 1) a higher rate; 2) broader definitions that are not limited to basic research and encompass the kind of applied or development research common in partnership arrangements; 3) volume credit at 10%; or 4) some combination of these enhancements. • Alter the two—tier structure of the credit rate so that the incentive does not drop for incrementally higher investment of R&D. • Ensure continuation of R&D tax credit program currently under sunset review by the legislature.
Issue Statement: It is difficult to estimate the usage of tax credit programs and with the current budget situation in Arizona, it is important that the cost of programs be accurately estimated. In addition, establishing public trust and accountability is an important consideration in developing new programs. Therefore, an oversight board must be considered when recommending the use of public money. **Timeline and Metrics: TBD**	**Recommendation: Create a Strategic Investment Board (SIB)** Appointed by the Governor and approved by the legislature, this Board will provide oversight of the Small Business Opportunity program, as well as the R&D tax credit program and Arizona's Fund of Funds program. This will allow the State to monitor and limit the fiscal cost to the state, as well as ensuring trust and accountability of public funds. The SIB would determine investor/company eligibility for any tax credits before investments are made and monitor the investor/company to ensure trust and accountability of the program. • SIB responsibilities include: Arizona Venture Capital Program - fund of funds oversight, hiring fund manager and determining final investment allocations for fund of funds, as well as overseeing the R&D tax credit and Small Business Opportunity programs. • SIB would publish an annual report on their activities to the Governor and Legislature.

Technology Business Infrastructure Committee – Draft Recommendations

Situational Analysis: Arizona is currently seen as a second-tier destination for knowledge-based industries and is struggling to compete with states already established as leaders in the nation. Business, community and economic development leaders all agree that technology and knowledge-based industries need the support of strong educational systems, highly skilled labor, and a pro-active business climate. Unfortunately, Arizona's best and brightest minds often move to other states because we lack high-end job opportunities. Collectively, we must foster opportunities that serve to retain knowledge leaders and create an environment that attracts the best to Arizona.

Success in the 21st century depends on a state's ability to develop a foundation that supports business innovation and technology development. Building on core competencies, attracting private investment, encouraging investment in specialized research and research facilities, developing a critical mass of specialized talent, and encouraging the transfer of knowledge that leads to technology commercialization are all critical to building our knowledge-based economy.

Innovative technologies and new discoveries can lead to the creation of new industries, as well as revitalize existing industries. Arizona has demonstrated selective success in Aerospace and Defense, Biosciences, Environmental Technology, Semiconductor and other Electronic Components, Software and Information Technology, Telecommunications and Optics. According to a recent core competency analysis of our public universities, Arizona has a tremendous opportunity to build a world-class sustainable systems industry. As global markets focus on sustainability and demand increases, Arizona is competitively positioned to lead.

Arizona's recent $100 million biotech investment in the Translational Genomics Research Institute (TGen), $440 million for construction of new research facilities at state universities and proposition 301 funding for research and development signal a clear commitment toward building a diversified economy based on science and technology. Moreover, according to a recent study, Arizona's technology industry supports jobs for 549,823 Arizonans statewide, with a total economic impact of $35.7 billion a year and a total payroll of $22.9 billion annually. Arizona's high tech businesses pay an average salary of $54,000 compared to $29,000 for all other industries.

Building on this solid base, Arizona must focus on establishing policies and programs that retain and grow companies in areas where we have the potential to become a recognized leader. Today's strengths are tomorrow's weaknesses if Arizona's business climate is not flexible enough to quickly adapt to an ever-changing environment to capture the technology trends of the future. Only through partnerships and prudent investments can Arizona truly develop a knowledge-based economy that is more entrepreneurial, competitive, fast moving, networked, and technology-based.

Currently, many of Arizona's economic policies encourage low wage job creation and are not consistent with building a knowledge-based economy. Access to capital combined with higher education and tech transfer opportunities are interrelated and essential links to fostering an entrepreneurial business climate in Arizona. As stated in the Morrison Institute "Five Shoes Waiting to Drop" Report, the ability of communities to take concepts and create new companies will be an important factor for future economies.

Arizona's success will be determined by how well the public and private sectors work together to create quality jobs for the residents of today and children of tomorrow. The world is changing and Arizona's economy must be nimble and adaptable to meet future needs. Our business and community leaders working together will ensure Arizona's competitive position in the global economy.

Retention & Growth of Existing Technology Companies

Issue Statement:

The Arizona Technology Impact Analysis, presented to the Council in September 2003 outlined Arizona's technology business competitive position in relation to the national average. Over the past decade, Arizona has experienced a significant decline in technology business and employment concentration compared to the national average. The stakes are high as Arizona, like many U.S. states, is faced with the possibility of losing its manufacturing base to countries offering lower-cost labor options. Arizona has a real opportunity to become a leading trade portal to South America and Asia. Infrastructure development to provide easy access for goods and services, specifically improved port access, should be a primary focus in furthering Arizona's relationship with Mexico.

Arizona must develop its knowledge-based core competencies and supply chain opportunities to build a globally competitive business environment. The private and public sectors collaborate, share resources and knowledge, and develop cost-sharing programs that ultimately improve the states competitiveness.

Recommendations:

Enhance Private and Public Sector Core Competencies (Short-term)

- Build Advanced Manufacturing Roadmap for Arizona - assess the technology-manufacturing environment and determine opportunities and threats. Work with industry leaders to develop strategies that grow Arizona's manufacturing base and offset job losses as a result of manufacturing operations going to Mexico and China.
- Work with the Arizona Department of Commerce to develop a roadmap for advanced communications/IT and a prospectus for Sustainable Systems and incorporate key findings and recommendations into the technology blueprint for Arizona.

Explore Technology Opportunities in the CANAMEX Corridor

Establish Arizona/Mexico Knowledge-based Manufacturing Program - Develop a case study to support the retention of knowledge-based jobs utilizing Arizona's relationship with Mexico Highlight the benefits of locating or expanding operations in Arizona with a direct link to Mexico. Explore establishing joint incentives between Arizona and Mexico to support this concept and market benefits to other key advanced manufacturing companies.

Improve Industry Alliances to Strengthen Competitiveness (On-going)

Existing university alliance programs are not coordinated to maximize effectiveness and do not comprehensively support future industry requirements for research and training of current and future employees for technology industry growth. Extend the T-Gen model to other industries to capture a national/international leadership role for AZ technology/university joint initiatives.

Enhance Arizona's Supply Chain Development Program (On-going)

Provide supply chain support through the AZBusinessLINC.com program to offset higher operating costs incurred by utilizing non-Arizona suppliers. Coordinate input from large and small organizations to further develop Arizona's supplier network, creating more supplier options for Arizona companies. Assist in creating a base of local suppliers capable of meeting the needs of Arizona's technology companies by creating opportunities for smaller companies to develop strategic alliances to successfully compete for large contracts.

<table>
<tr><td>Timeline and Metrics: TBD</td><td></td></tr>
<tr><td colspan="2">Favorable Business Environment</td></tr>
<tr><td>Issue Statement:

Overall, Arizona offers technology companies a favorable business climate. However, in this fiercely competitive national and global environment, states must reevaluate their business policies to keep pace with the ever-changing knowledge based economy. Policies of the industrial age will not sustain competitive quality growth, particularly with significant lower-cost labor options abroad. Policies must be flexible and adaptable to the needs of future technology trends. Specifically, Arizona's tax policies must be analyzed to determine our competitiveness in the 21st century global knowledge-based economy.</td><td rowspan="2">Recommendations:

State must invest in a strong and robust Department of Commerce empowered to champion the programs and recommendations that build Arizona's knowledge-based economy. (Short-term; on-going)

Improve Tax Structure to Encourage Investment in Innovation and Technology Development. (Mid to Long-term)
The CFRC recommendations will be used as a foundation to further establish business friendly programs that encourage investment in Arizona. These may include reducing business personal property taxes and increasing the "weighted sales factor."

Improve relationship with Federal, State and Local Policy Makers and Communicate the Competitive Needs of Arizona's Technology Industry (Short-term; on-going)
Working with Arizona's existing technology businesses, develop clear, agreed upon messages and priorities that will support technology development within the state. Also, align and develop joint priorities with other key business groups (i.e., statewide, regional and local chambers, economic development organizations and tech councils, etc.) to ensure a balanced, statewide approach to sustainable economic development. Develop forums for effective communication with critical policy makers at all levels of government.

Develop and target business incentives to attract, grow and retain knowledge-based industries. (Mid to Long-term)</td></tr>
<tr><td>Timeline and Metrics:</td></tr>
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Knowledge Industry Brand Development and Awareness	
Issue Statement: Arizona leads in semiconductor jobs and aerospace/defense electronic component manufacturing. We're also developing strengths in the biosciences and software industries. However, Arizona's knowledge assets are not well known within or outside the state. Marketing efforts are fragmented and add to the lack of a unified brand for Arizona – outside of tourism and retirement. Technology assets are not integrated into a unified marketing strategy. Most communities, regions and statewide organizations have developed marketing materials independent of each other, a contributing factor to Arizona's lack of brand awareness as an innovation and technology center of excellence. If we are to compete in the 21st century, we must communicate and market Arizona's innovation and technology core competencies and position the state as a global leader in the knowledge-based economy.	**Recommendation: Brand Arizona as a Global Leader in Discoveries, Innovation and New Technology Development. (Short-term; on-going)** Position Arizona as a global leader and develop strategies that grow and attract cutting-edge businesses and knowledge leaders. Fuel success in the new global economy by developing unified key messages to be used by all technology-supporting economic development organizations – similar to the Arizona Tourism model. Improve awareness of Arizona's knowledge assets by engaging local business and community leadership. As ambassadors to the state, our community and business leaders, along with the media must fully understand the value of building Arizona's knowledge-based economy. Create a forum for the Governor and Arizona's business leaders to meet with venture capitalists in out-of-state markets to encourage investment in Arizona-based companies. Support statewide, regional and local recruitment efforts by utilizing members of the Governor's Council on Innovation and Technology as ambassadors for Arizona's economic development community to encourage companies to start, expand R&D or relocate headquarters in Arizona.
Timeline and Metrics: TBD	

Education and Knowledge Worker Development	
Issue Statement: Arizona has substantially increased education funding since 1999, making significant improvements in its national rankings. Arizona ranks first in the average salary of instructional staff on a cost of living basis, first in capital improvements spending per pupil, tenth for overall dollars spent on capital improvements and 18th for academic achievement of its students. While the majority of recent funding increases have gone to K-12, Arizona ranks last among U.S. states in terms of expenditures per student. Arizona graduates only 75% of its high school students, compared with a national average over 85%, and ranks 49th in the nation. Arizona's economic future depends on the quality of our workforce - the number one priority for businesses considering expansion or location. A highly skilled workforce allows companies to continue rapidly producing goods and services marked by innovation, knowledge and quality. If Arizona is to enjoy the benefits that come from a knowledge-based economy, we must improve productivity and competitiveness of workers and employers; provide training tools to develop skills required for quality jobs; and establish lifelong learning opportunities.	**Recommendations:** **Education:** Support ongoing educational efforts by facilitating the involvement of technology companies to make certain the needs of the knowledge-based economy are being addressed throughout the Pre-K to post-secondary (P-20) curriculum, with a particular focus on K-12. **(On-going)** **Knowledge Worker Development:** • Work with Governor's Office, regional tech councils, other economic development groups and the technology business community at large to restore/preserve funding for the Arizona Job Training Program**. (Short-term)** • Work with and support the Governor's Council on Workforce Policy to grow a thriving knowledge-based workforce that fulfills future needs of the technology community and aligns programs with technology industry economic development strategies as well as training needs. **(Short-term; ongoing)** • Revise IT Training Tax Credits program to include additional private sector companies as eligible training providers. Make it easier for applying companies to determine whether or not they qualify. **(Short to Mid-term)** • Establish a taskforce to analyze Arizona's science and technology talent pool and increase science and engineering post secondary enrollments. Based on key findings, develop programs to reverse the technology "brain drain" that threatens Arizona's ability to compete in the knowledge-based economy that retains new graduates in the state workforce (possibly through state-sponsored scholarships). **(Short to Mid-term)** • Establish Intern Programs - Investigate implementation of a pilot program where students (possibly K-12 and higher) interested in technology fields have an opportunity to work with technology companies and gain needed practical experience. **(Short to Mid-term)** • Explore training partnership opportunities to facilitate workforce development and ensure that a diverse labor force is available for technology business development. **(Short to Mid-term)** Establish entrepreneurship, leadership and managerial training programs to develop the skills necessary to commercialize ideas and improve deal flow in Arizona.
Timeline and Metrics: TBD	

Commercialization and Entrepreneurial Assistance	
Issue Statement: Arizona's entrepreneurial assistance programs are fragmented and disconnected throughout the state. There is no single source of information available to technology-focused entrepreneurs that provide a complete listing of all programs. Many of the programs are focused on developing business plans, operations, structure, marketing, networking, etc. Access to equity capital, incubator assistance, and technology assessments are not readily available as part of the services currently being provided. In addition, Arizona lacks in-depth assistance specifically for bioscience entrepreneurs. **Timeline and Metrics: TBD**	**Recommendations:** **Coordinate entrepreneurial assistance programs that foster strong management talent for start-up and expansion businesses, as well as facilitate early-stage capital opportunities. (Short-term; on-going)** **Develop a statewide technology commercialization assistance center program to provide support to the universities and private sector. (Short to Mid-term)** The State, in partnership with the universities, regional technology councils and others, should implement a statewide technology entrepreneurial assistance commercialization program similar to UCSD CONNECT in San Diego, Ben Franklin in Philadelphia and Oklahoma Technology Commercialization Center. In an effort to support entrepreneurship and commercialization of new technology, Arizona's universities recently announced two new programs: ASU Technopolis and U of A Innovation Center. The regional technology councils have been allocating resources to support cross-cluster technology business infrastructure development. Moreover, the Arizona Business Accelerator has recently been formed in Greater Phoenix and the Technology Development and Research Institute in underway in Tucson. A statewide focus with regional centers and rural outreach would help to link and integrate regional resources, projects and programs to create a "no-wrong-door" approach to assisting entrepreneurs throughout Arizona focused on commercialization of new technology.

<table>
<tr><th colspan="2">Federal Leadership and Funding Opportunities</th></tr>
<tr><td>Issue Statement:
Arizona is considered a donor state, contributing more to the federal government than it receives. This has a direct impact on our competitiveness. Federal research funding is a primary source for innovation, discoveries and technology development. Arizona must do a better job in securing federal resources to improve our competitiveness in the global marketplace.

Timeline and Metrics: TBD</td><td>Recommendations:
Through a statewide virtual resource center to assist universities, technology companies and entrepreneurs, identify and facilitate access to federal funding and programs that encourage investment opportunities for technology development in Arizona. (Short-term; on-going)

Work with the Congressional delegation to better communicate existing and future needs of the technology industry to further develop Arizona's knowledge-based economy. (Short-term; ongoing)

Establish a physical presence in Washington D.C. to advocate for Arizona. Planning should be coordinated with stakeholders currently in D.C. (Mid-term)

Create a taskforce to explore and advocate for creation of a federal laboratory of the class of the Pacific Northwest National Laboratory to compliment/support one or more of the technology roadmaps under development in Arizona. (Short-term)</td></tr>
<tr><th colspan="2">Telecommunications Infrastructure Development</th></tr>
<tr><td>Issue Statement:
Arizona's difficulties in telecom services are a matter of distribution rather than volume. Multiple providers of fiber optic long haul cable service, for example, serve the Phoenix and Tucson metropolitan areas. Elsewhere, such broadband access is limited or nonexistent. Efforts are underway to increase telecommunications services to more rural areas of the state, but these efforts will be constrained in the near term by financial conditions among the major service providers. If there is no change in the current geographic pattern of telecom services, then economic development and access to workforce in the rural areas will become even more concentrated in Arizona's central corridor. This will limit opportunities for the state and specifically impact education.</td><td>Recommendation:

Work with the Arizona Telecommunications and Information Council to develop recommendations that focus on building out needed telecommunications infrastructure, specifically in rural Arizona. (On-going)</td></tr>
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